

# NATURAL HISTORY MISCELLANEA

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## Mammals of Goose Lake Prairie Nature Preserve

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Goose Lake Prairie Nature Preserve consists of 1523 acres of prairie, marshland, and thicket vegetation located near the Illinois River, six miles east of Morris, Grundy County, Illinois. The area, part of a state park, was purchased in 1968-69 to preserve the last sizeable remnant of native prairie in the state. The purpose of this study was to document the composition and density of the mammal fauna at the time the preserve was established so that the effects of management and preservation can be assessed. Also, the information reported herein should provide a guide for those interested in further observing or studying the mammals of the prairie

### DESCRIPTION OF THE AREA

The preserve is located on shallow till plain of clay to sandy loam which is underlain by Ordovician limestone and Pennsylvanian sandstone. The elevation ranges from about 502 feet in the northwest part of the tract, rising to 530 feet at three locations in the central part, then sloping to 506 feet in the marshes at the southern part of the area. The original vegetation was probably mesic prairie grading to marshland vegetation in the numerous potholes and sloughs. Major species of upland grasses at present are big bluestem (*Andropogon gerardi*), little bluestem (*21 scoparius*), Indiangrass (*Sorghastrum nutans*), switchgrass (*Panicum virgatum*), and cordgrass (*Spartina pectinata*). Extensive, nearly pure stands of bluejoint (*Calamagrostis canadensis*) occupy many wet, poorly drained areas. Vegetation bordering most marshlands is composed primarily of cattail (*Typha* sp.), bulrush (*Scirpus* sp.), and common reed (*Phragmites communis*).

Intensive grazing and attempts at cultivation on the higher elevations have degraded several parts of the tract. The northwest part of Blocks 2 and 4, the center of Block 5, and smaller areas in Blocks 1, 6, and **10** have extensive areas of bluegrass (*Poa pratensis*). Hawthorn (*Crataegus* sp.), and crabapple (*Malus* sp.), while found on much of the area, is particularly abundant in Blocks 1, 5, 9, and 10. Blocks 6 and 8 contain several thickets of quaking aspen (*Po pul us trem ul oides*), dogwood (*Cornus* sp.), and hazel (*Corylus americana*). A narrow strip of soft maple (*Jeer saccharin um*) and willow (*Sal ix nigra*) woods borders the slough in Block 1, and one, primarily of burr oak (*Quercus macro-*

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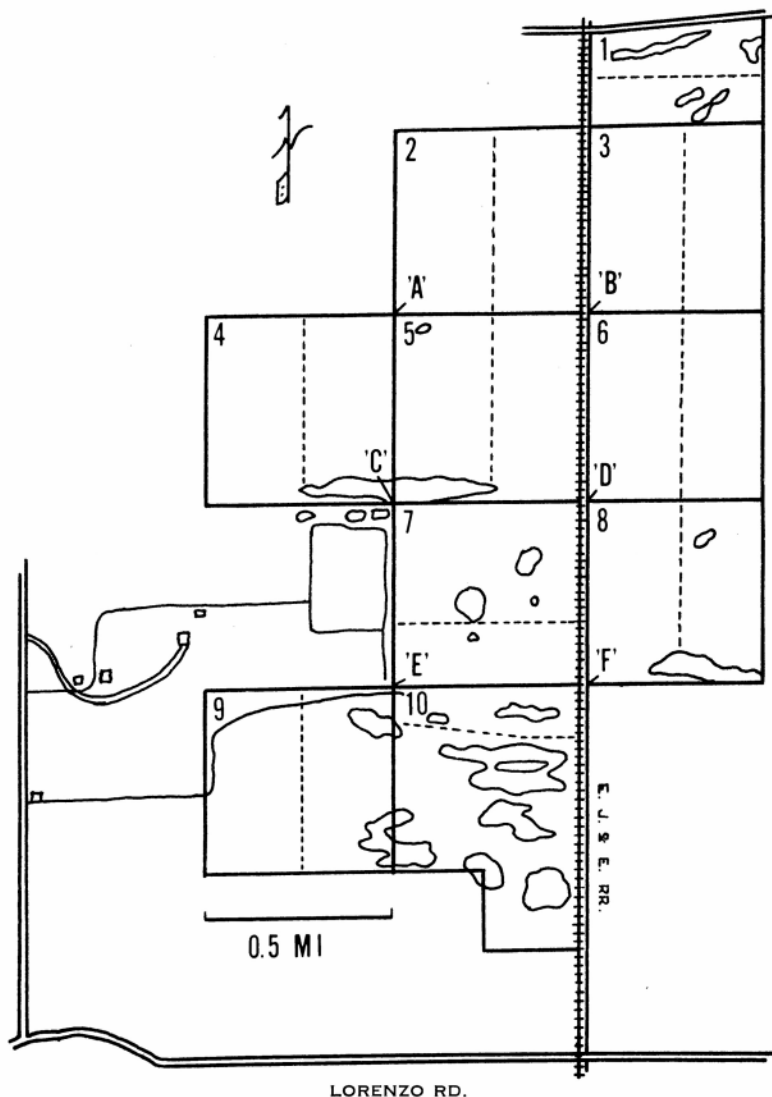


Fig. 1. Outline of Goose Lake Prairie Nature Preserve. Blocks are identified by numbers in upper left corner of each. Dotted lines represent location of trap lines. "E" at southwest corner of Block 7 is site of permanent marker. Boundaries of each block can be determined by fence lines and the towers located at corner and center of each block along the railroad. Development of facilities of the state park is to the west of Block 7.

*carpa*), occupies a ridge between two marshes in Block 10. The preserve thus contains a variety of habitats ranging from grassland and marshland to woodland. Ground cover is mostly heavy in the grassland but becomes more open in areas where forbs or trees are abundant.

#### METHODS

The survey was conducted periodically from October 1969 to February 1973 but most data was obtained during the summer, autumn, and winter 1971-72. Small mammal trapping was conducted during late September, October, and early November 1971. At this time 200 mouse traps, spaced 12.5 feet apart, were set across the approximate center of each block (see Fig. 1) by compass and pacing. The blocks are those used in the Master Plan for management of the preserve. The beginning of each line is located thus: Block 1 830 feet south of Collins Road boundary, beginning on the east side of the railroad and extending east; Block 2-1200 feet east of corner at point A, Fig. 1, and proceeding north; Block 3-1300 feet east of railroad at point B, Fig. 1 and proceeding north; Block 4-1275 feet west of point C and proceeding north; Block 5-1200 feet east of point C and proceeding north; Block 6-1300 feet east of railroad fence at D and proceeding north; Block 7—1060 feet north of marker at E and proceeding east; Block 8-1300 feet from fence at F and proceeding north; Block 9-1350 feet west of marker at E and proceeding south; and Block 10-400 feet 160° from marker at E and proceeding east. Each line was run for five consecutive nights, representing 1000 trap nights for each block and a total of 10,000 trap nights on the entire preserve. Weather was similar during the trapping in each block (temperatures 20° to 75° F. and one or two days of rainy weather on each) and results should be comparable.

In addition the entire area was examined regularly for sign during the summer, autumn, and winter of 1969-70 through 1972-73. Records were kept of tracks, observations, and other sign. Live traps were set in likely locations for large mammals during the autumn of 1971.

No effort was made to place traps according to habitat because of the mosaic nature of the habitat and the fact that thickets often grade imperceptibly into pure grassland. Also, the management plan for the preserve calls for burning or brush removal by block. Trapping by block thus affords a better basis for evaluating management in terms of changes in the mammal fauna.

#### THE MAMMAL FAUNA

A total of 28 species of mammals was recorded on the preserve during the survey. Nine species of small mammals were obtained through snap trapping; the remainder were recorded by live trapping, observation, and reading tracks and other sign. The following information was obtained.

**Opossum (*Didelphis virginianus*)**—The species occurs commonly over the entire preserve. Tracks or individuals were observed in all blocks but were most abundant around the marshes in Block 9 and along the wooded fence rows bordering Block 7 where several were live trapped. Of a total of 15 scats examined, 3 contained pits of wild plum, 6, choke cherry seeds, 1 contained cottontail fur, 1 contained duck feathers, 1

contained pheasant feathers, and 4 were unidentified. One opossum was observed feeding on crab apples in Block 5 and another ran from the body of a dead goose in Block 10 in November 1971. The animals obviously exhibit catholic tastes on the preserve as in other areas.

Mole (*Scalopus aquaticus*). The eastern mole is common over the entire preserve, and tunnels were recorded from all but Blocks 3, 6, and 9 where they probably also exist. In the summer of 1971 I noted most signs in Blocks 1, 4, 5, and 10 where ridges sloped more abruptly toward the depressions, but in the early fall no such relationship was noticed.

Masked shrew (*Sorex cinereus*). This species was the third most abundant species taken by snap trapping (124 specimens or 13% of the total). Specimens were taken in all blocks, the maximum coming from Block 5 (23 animals). In 8 of the 10 blocks masked shrews were taken in larger numbers toward the end of the 5-day trapping period. The first two days accounted for 23 % of the masked shrews taken, the last two days 52%. This may reflect removal of some of the larger and more active voles in the first days of trapping.

Short-tailed shrew (*Blarina brevicauda*). This shrew was abundant on the entire preserve and was the second most abundant small mammal taken (185 or 20% of the total catch). Animals were taken in all blocks and appeared to be evenly distributed (range 13 to 30 from each block). The catch was also fairly evenly distributed over the 5-day trapping period (23, 20, 26, 15, and 16 taken on the respective days). This probably indicates a heavy population.

Least shrew (*Cryptotis parva*). This species is rare on the preserve. Three specimens were taken, surprisingly all from 2 different blocks on the same night.

Red bat (*Lasiurus borealis*). This, the only species of bat positively identified, was seen only occasionally in Blocks 1 and 10 which contain or border small areas of woodland.

Raccoon (*Procyon lotor*). I found raccoon sign on every block in the preserve. Their presence was most evident in the marshes in Block 10, but every pathway and edge of the water contained sign. A total of 32 scats were examined. Summer scats (26) contained crayfish, blackberry, wild plum, and chokecherry remains. A dense bull frog population in the slough in Block I was heavily exploited by raccoons during July 1971. Nearly every muskrat house in the marshes of Block 10 was partially torn apart during the summer of 1971. Snapping turtles were flushed from house tops on several occasions and examination disclosed remains of turtle eggs on 4 of 18 houses examined on one occasion. One raccoon was observed while it unsuccessfully stalked a brood of mallards. After the ducks had escaped the animal climbed the nearest muskrat house and rummaged systematically through the topmost contents.

Least Weasel (*Mustela rixosa*). No least weasels were taken by trapping. Tracks were found during the winter of 1971-72 in Blocks 1, 5, 7, and 10. These were found on 3 different occasions.

Long-tailed weasel (*Mustela f. renata*). No weasels of this species were taken in live traps, but their tracks were found in Blocks 1, 2, 3, 5, 7, and 9 in the winter of 1971-72. Tracks indicated a population of 3

individuals on the preserve.

Mink (*Mustela vison*) . Mink are abundant on the preserve and appear to range widely. During the summer and fall their tracks appear regularly in the mud bordering nearly all the marshes and ponds. In the winter of 1971-72 tracks were recorded from Blocks 2, 5, 6, 7, and 10. They were most abundant in the marshes of Block 10. However, tracks were found in the prairie of Block 2, some distance from water. The largest number accounted for on one day was 5 or 6 individuals, four of these in Blocks 7 and 10. A total of 8 scats was examined. These contained crayfish remains and vole fur. Interestingly, several animals in Block 2 in the winter coasted down the side of snow-covered grass hummocks while traveling. These slides resembled small otter slides, often described in mammal literature.

Striped skunk (*Mephitis mephitis*) . I found tracks of skunks regularly only along the railroad embankment where burrows were common and on the paths along the west border of the preserve. Tracks were found on several occasions in Block 5 and once in Block 10 after a snow. The species appears to be abundant in the vicinity of the preserve where there are burrows.

Badger (*Taxidea taxus*) . This species was not widespread or common on the preserve. Badger digging and tracks were found on three occasions during the summer and fall of 1971 in the center part of Block 5 and once in the southwest part of Block 2. John Schwegman told me of possible badger sign seen in Block 3 during the summer of 1970.

Red fox (*Vulpes f ulna*) . Surprisingly, red fox sign was not abundant on the preserve during the survey. During the winter of 1971, tracks of one animal were found in the southwest corner of Block 8 and across the north side of Block 10, and of another at the south part of Blocks 4 and 5. In the winter of 1971-72 I found tracks in Blocks 1, 4, and 10, but never of more than one animal at these locations.

Gray fox (*Urocyon cinereoargenteus*) . The track of one animal was found in the wooded part of Block 10 during February 1972. The animal had come from the east across the tracks and then circled in the marshes and, to a small extent, woods.

Coyote (*Canis latrans*) . During the fall and winter of 1970-71 two coyotes resided on the preserve. Most of their activity was confined to Blocks 1, 2, 3, and 4 where they were seen on three occasions and were tracked. They did use private land to the west and east of the preserve. During the summer of 1971 a den was located at the northwest corner of Block 4. It was vacated by early August and at this time the animals concentrated activity in Blocks 9 and 10 where the marshes were drying up. Tracks were also found in the north part of the preserve at this time. Four animals regularly used the preserve throughout the early winter, but in February only two were located at the south part.

A total of 34 scats were examined from June 1971 to February 1972. Small rodent remains were found in 14 scats, muskrats in 10, rabbits in 8 and pheasants in 5. Both rodent and rabbit or rodent and pheasant remains were found in 8 scats. Muskrats figured prominently in the coyotes' diet because of habitat conditions in 1971. The marshes began

to dry up in July, and coyotes began hunting along the margins of the marshes on Block 10. Muskrat remains appeared in most of the scats at this time. In early September several areas were found in Blocks 7 and 5 where coyotes had dug for rodents.

Goose Lake Prairie is one of the few areas in Illinois where coyote howling can be heard. During the summer and fall of 1971 they howled most often shortly after dusk on clear evenings, but howling also occurred throughout the night.

In 1972 less activity was noted. The only calling I heard was to the east of the preserve. High water during most of the year may have caused the animals to shift their activities to adjacent areas.

Woodchuck (*Marmota monax*) . Woodchucks occur only along the E. J. and E railroad spur that bisects the preserve. They are especially common at the south part along Block 10. One animal resided under the cabin at the northwest corner of Block 10 during the summer of 1971, but this species finds little suitable habitat on most of the preserve.

Franklin's ground squirrel (*Citellus franklini*). This species is included in the list on the basis of one individual sighted on the path at the northwest corner of Block 10 September 27, 1969. Suitable habitat exists in parts of Block 10 and on the ridge traversing Blocks 2, 4, and 5 but none were seen or trapped.

Thirteen-lined ground squirrel (*Citellus tridecemlineatus*) . This species is included on the basis of a small number of animals seen on the grounds of the substation, located on the northwest corner of Block 1. A small area here is mowed and provides suitable habitat.

Fox squirrel (*Sciurus niger*) . One individual resided in the burr oak copse in Block 10 during the fall and winter of 1971-72. A nest was seen in Block 1 in the fall of 1971, but no animals were noted.

Pocket gopher (*Geomys bursarius*) . Small numbers of this species are found in the northwest corner of Block 4 and on the ridge in the west and central part of Block 5. These are the best drained parts of the preserve. Population densities and movements were not determined nor were any specimens taken but the area of most activity is in Block 4. Holes where a badger had dug for gophers were found in the center part of Block 5 in the summer of 1971.

Western harvest mouse (*Reithrodontomys megalotis*) . This species is rare, but appears well distributed on the preserve. A total of seven specimens were taken in 10,000 trap nights during September and October 1971. Animals were taken in Blocks 2, 3, 4, 6, and 9 at this time. Also, two specimens were taken in Block 5 in October 1969 and one specimen came from Block 3 in November 1970. Irruptions of this species have occurred in east-central Illinois and western Indiana recently but there is no evidence for such an increase on the preserve. Harvest mice were taken from a variety of habitats from pure grassland to mixed grass-forb associations.

Deer mouse (*Peromyscus maniculatus*) . This species is not common at Goose Lake Prairie. Only 12 specimens were taken during the fall 1971 trapping, compared to 84 *Peromyscus leucopus*. Deer mice did outnumber white-footed mice taken in Blocks 3 and 4, both of which

contain less woody vegetation than other areas of the preserve. No deer mice were taken in Blocks 1, 6, 9, and 10, precisely the blocks where the largest number of white-footed mice were trapped and where most woody vegetation is found.

White-footed mouse (*Peromyscus leucopus*). This species was the fourth most abundant species taken in the snap trapping (84 individuals or 9%). Eighty per cent were juvenile or subadult and 62 per cent were males. White-footed mice were most abundant in Blocks 1, 6, 9, and 10, areas having a large amount of forbs and woody vegetation.

Meadow vole (*Microtus pennsylvanicus*). This was the most abundant small mammal taken on the preserve. Highest numbers came from Blocks 2 and 5, while the lowest came from Blocks 1, 7, 9, and 10. These latter blocks contained large amounts of woody vegetation except Block 7 which is the poorly drained area and contains large stands of bluejoint grass. This habitat characteristically supported low small mammal populations. Of the total catch 48% was male, and 46% was classed as adult.

Prairie vole (*Microtus ochrogaster*). Of the 932 small mammals trapped, only 25 (3%) were of this species. Largest numbers (9, 5, and 4) came from Blocks 1, 3, and 7 which are not greatly different from the remainder of the preserve. Block 7 in fact is one of the wettest areas. It is difficult, however, to draw conclusions from the small numbers taken.

Muskrat (*Ondatra zibethicus*). Generally, this species is abundant on the preserve, and all marshes, potholes, and ditches support populations at times. Because of the shallow water, however, populations fluctuate greatly. During the late summer and fall of 1971 all bodies of water, except the center of the three south marshes, dried up, and the muskrat population dropped to near zero. A few animals persisted in the fall in dry prairie at the south end of Block 4 and perhaps in a few other localities, but even these animals undoubtedly had disappeared before winter. By April 1972 a small amount of activity was seen around the edge of the south marshes. The preserve population undoubtedly can build up rapidly when water conditions improve because of permanent habitat in the vicinity of the prairie.

House mouse (*Mus musculus*). This species is rare on the preserve, a total of only five specimens being taken during the fall of 1971. These came from Blocks 3, 4, 7, and 8, all locations being at least one half mile from buildings. Whether a sparse resident population exists on the preserve or whether these represent wandering individuals was not determined.

Cottontail rabbit (*Sylvilagus floridanus*). Cottontails are found locally in varying numbers on the preserve. Most animals are found in the vicinity of copses of woody vegetation, but the population varied greatly from 1970-71 to 1971-72. In January 1970 tracks were found in small numbers, and in only Blocks 1, 7, 9, and 10. One year later rabbits were much more abundant with large numbers in Block 1 on the site of an old farmstead. Rabbits were also on the ridge in Block 5 and along the railroad directly to the east. Small numbers were in the northwest corner of Block 4, in Blocks 8 and 10 and throughout much of Block 9. Few rabbits were found, however, in areas with only grassy cover.

White-tailed deer (*Odocoileus virginianus*). Deer are found over the entire preserve. As many as 15 were accounted for on one trip in January 1972. During the summer animals are found in all localities, but in winter they are grouped nearer to areas having woody vegetation. The largest number range from Block 1 to woods lying west of the preserve, and these animals also range to the east of the prairie. Another group ranges primarily across Blocks 8 and 10 and to the crabapple and aspen thickets in Blocks 3, 5, 6, and 8.

#### DISCUSSION

The mammal fauna of Goose Lake Prairie Nature Preserve reflects the diversity of habitats on the area. The mosaic of marshland, grassland, shrubland, and woodland provide suitable habitat for most of the species of wild mammals found in that part of Illinois.

A total of 932 small mammals were taken in 10,000 trap nights in the fall of 1971. Overall trapping success was 9.2 per cent. Range of success on any one transect in one night was from 2% to 20% (see Table 1). Composition of the catch was meadow vole (*Microtus pennsylvanicus*-487 (52%)), short-tailed shrew (*Blarina brevicauda*) 185 (20%), masked shrew (*Sorex cinereus*) 124 (13%), white-footed mouse (*Peromyscus leucopus*) 84 (9%), prairie vole *Microtus ochrogaster*) 25 (3%), deer mouse (*P. maniculatus*) 12 (1+%), harvest mouse (*Reithrodontomys megalotis*) 7 (<1%), house mouse (*Mus musculus*) —5 (<1%), and least shrew (*Cryptotis parva*)-3 (<1%). The three most numerous species, which composed 85 per cent of the catch, are those characteristic of dense grassy vegetation and moist soil.

		Day					Total
		1	2	3	4	5	
Block	1	18	29	22	10	4	83
	2	24	20	32	21	15	112
	3	26	14	21	13	21	95
	4	22	24	22	10	11	89
	5	29	24	40	27	16	136
	6	15	34	21	15	13	98
	7	10	8	13	6	17	54
	8	13	20	23	23	17	96
	9	22	23	21	7	19	92
	10	14	11	26	9	17	77
		193	197	241	141	160	932

Table 1. Catch of small mammals on each trap line by day and block, Goose Lake Prairie Nature Preserve, Fall, 1971.

The composition of the small mammal population in an idle field adjacent to the preserve, however, was considerably different. Fifty traps, run for three days, took 14 *Mus musculus*, 6 *Peromyscus leucopus*, 4 *P. maniculatus*, 3 *Microtus pennsylvanicus*, 2 *Blarina brevicauda*, and 2 *Reithrodontomys megalotis*. This area, of annual forbs and grasses, supported a higher population than the prairie.

The catch of small mammals by block for each day of the 5-day trapping period is presented in Table 1. In general, the catch of 4 of the 5 major species declined. Only that of the masked shrew increased. This



may indicate that removal of some of the more dominant or active species may be necessary before these shrews are taken in appreciable numbers.

Examination of the total catch by day also indicates that the small mammals might be sampled adequately in three days of trapping. The catch peaked on the third day, thus nearly 70% of the total number of animals and 8 of the 9 species were taken in the first 3 days of trapping. The composition of the catch in the first 3 days of trapping was similar to that for the 5-day period except for the masked shrew, as mentioned above, and the house mouse and least shrew which were taken in the last three days of trapping. These trends might be considered when future studies to measure changes in the mammal fauna are planned.

While most of the species to be expected in this part of Illinois were recorded on the preserve, some absences deserve comment. The moist grassy habitats of the prairie might be expected to support the bog lemming (*Synaptomys cooperi*) and jumping mouse (*Zapus hudsonius*), and the copses might possess pine mice (*Pitymys pinetorum*). Their absence, especially that of the jumping mouse in this survey is difficult to explain.

	<i>Microtus pennsylvanicus</i>	<i>Blarina brevicauda</i>	<i>Sorex cinereus</i>	<i>Peromyscus leucopus</i>	<i>Microtus ochrogaster</i>	<i>Peromyscus maniculatus</i>	<i>Reithrodontomys megalotis</i>	<i>Mus musculus</i>	<i>Cryptotis parva</i>		
1	33	13	11	16	9	0	0	0	1	=	83
2	72	21	13	2	0	1	1	0	2	=	112
3	55	15	10	2	5	5	1	2	0	=	95
4	37	30	11	4	0	3	3	1	0	=	89
5	84	22	23	6	0	1	0	0	0	=	136
6	56	17	10	12	2	0	1	0	0	=	98
7	26	11	9	2	4	1	0	1	0	=	54
8	52	21	10	9	2	1	0	1	0	=	96
9	38	21	17	14	1	0	1	0	0	=	92
10	34	14	10	17	2	0	0	0	0	=	77
	487	185	124	84	25	12	7	5	3	=	932

Table 2. Total catch, by species, on each block at Goose Lake Prairie Nature Preserve, Fall 1971

The catch of small mammals by species and area of the preserve is given in Table 2. The composition and density of the population is similar to what might be expected. Population densities were lowest in the poorly drained grassland such as found in Block 7 and highest in the well drained, more diverse habitats such as found in Block 5. Thus, in the future only certain blocks of the preserve may be sampled to determine changes in the small mammal fauna. The status of many of the larger mammals that range over several parts of the preserve may be

assessed by more general surveys during the winter when snow covers the ground.

Continued surveillance of the mammal fauna should be carried out to assess the effects of habitat management, preservation, and other environmental changes that may occur.

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